SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Computer Science and Engineering (Data Science) **Academic Year: 2022** **Duration: 3 hours**
Date: 23.01.2023
Time: 09:00 am to 12:00 pm
Subject: Database Management Systems (Semester III) **Marks: 75**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.
(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagrams, wherever necessary.

Question No.		**Max. Marks**
Q1 (a)	Describe different types of DBMS users and 3 layers of DBMS abstraction.	[07]
Q1 (b)	1. Illustrate following term with symbolic notation and suitable example (**any four**) **(Two mark each**) i. Weak and strong entity set ii. Mapping cardinalities iii. Specialization and generalization iv. Single valued, multivalued attribute and ~~Single~~ simple and composite attribute v. Relationship Set	[08]
Q2 (a)	1. Galleries keep information about artists, their names (which are unique), birthplace, age, and style of art. For each piece of art work the artist, the year it was made, its unique title, its type of art (e.g. painting, sculpture), and its price must be stored. i. Pieces of artwork are also classified into groups of various kinds e.g., portraits, still life works by Picasso or works by 19th century, a given piece may belong to more than one group. ii. Each group is identified by a name (like those given) that describes the group. iii. Galleries keep information about customers like persons (unique name, address, total amount spent, artist and the group of art that the customer tends to like). iv. Draw ER diagram for the database and convert it into equivalent schema. **OR** 2. In a relation scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold: {A–>B, BC–>D, E–>C, D–>A}, Determine the candidate keys of R? Also Illustrate concept of Primary set, super key, candidate key and foreign key.	[08] [08]

Q2 (b)	Explain set theory operators in relational algebra using suitable example.	[07]
Q3 (a)	**Write Relational Algebra using following schema for Q3(1) and Q3(2):** **Customer(c_id,c_name,c_age,c_city,c_state)** **Item(i_id,i_name,price,category)** **Order_item(c_id, i_id,quntity,date)** **1. Write Relational Algebra using above schema. (2 marks each)** i. Display ~~employee's~~ customer's information under the category of soap. ii. Find the names and age of all the customers living in *Andheri* or *Dadar*. iii. Find the customer who purchased on 1st January 2023. *iv.* Find the details of the customer those who are above 40 and living in *Maharashtra* **OR** **2. Write Relational Algebra using above scheme. (2 marks each)** i. As per policy shop is giving 15% discount to senior citizen. How many customers are entitled for the discount? ii. Display items whose name starts from *'B'* and having exactly *8* characters *(length is 8)*? iii. Company is giving 1/4 discount on each item then what would be the price of each item? iv. Display customer's info who bought 'Dabur Honey' on '10st January 2023'.	[08] [08]
Q3 (b)	1. Differentiate between Join and Subquery with example. 2. How Delete, Drop and Truncate are different in SQL. Explain with suitable example.	[03] [04]
Q4 (a)	1. Write SQL queries for the following database: - **Sailor (sid, sname, rating, age)** **Boat (bid, bname, color)** **Reserves (sid, bid, date)** i. Find the names of sailors who have reserved "White" boat. ii. Find the sailor name with highest rating. iii. Find the average age of sailor. iv. Find the age of oldest sailor for each rating level. v. Add the new boat to the database. Assume any values for required attribute. vi. Find the names of all the boats having 'S' as first letter in their Names. vii. Add a new table "Ride" having cust_name, bid, source, destination, fare and date as attributes. **OR** 2. For the following given database, write SQL queries: - **Person (driver_id, name, address)** **Car (license, model, year)** **Accident (report_number, date, location)** **Owns (driver_id, license)** **Participated (driverid, car, report_number, damage_amount)** i. Find the total number of people who owned cars that were involved in accident 2004	[07] [07]

	ii. Find the number of accidents in which the cars belonging to "LT" were involved. iii. Update the damage amount for the car with license number "Mum2011" in the accident with report number "AR120" to Rs. 4000 iv. Create relation persons_owns in sql v. Add a new accident to the database, assume any values for required attribute. vi. Delete the "FORTUNER" belonging to 'Sachin Mehta'. vii. Find the person whose names starts with 'K' and arrange in decreasing order of driver-id.	
Q4 (b)	1. Illustrate the types of Indexes 2. Distinguish between a B tree and a B+ tree	[04] [04]
Q5 (a)	**Answer the Following (Any two)** 1. Given a relation R(A, B, C, D) and Functional Dependency set FD = { AB → CD, B → C }, determine whether the given R is in second normal form (2NF)? If not convert it into 2 NF. 2. Check whether the given schedule is conflict serializable/View serializable or Not?	[05] [05]
	3. When a transaction is rolled back under timestamp ordering, it is assigned a new timestamp, why can it not simply keep its old timestamp? **4.** Explain states of transactions w.r.t ATM money withdrawal example.	[05] [05]
Q5 (b)	State whether following statements is True/False with proper justification: Recovery management component of database is responsible for ensuring the atomicity and durability of the transaction.	[05]

T1	**T2**	**T3**
R(X)		
		R(Y)
		R(X)
	R(Y)	
	R(Z)	
		W(Y)
	W(Z)	
R(Z)		
W(X)		
W(Z)		